THE ASTROPHYSICAL JOURNAL CONTENTS OF VOLUME 477, PART 1

1997 MARCH 1, Number 1

	Pag
SELF-SIMILARITY AND THE PAIR VELOCITY DISPERSION Somnath Bharadwaj	1
PHOTOIONIZATION, NUMERICAL RESOLUTION, AND GALAXY FORMATION David H. Weinberg, Lars Hernquist, & Neal Katz	8
VOIGT-PROFILE ANALYSIS OF THE Lyα FOREST IN A COLD DARK MATTER UNIVERSE Romeel Davé, Lars Hernquist, David H. Weinberg, & Neal Katz	21
LARGE-SCALE QSO-GALAXY CORRELATIONS FOR RADIO-LOUD AND OPTICALLY SELECTED QSO SAMPLES N. Benítez & E. Martínez-González	27
TESTING THE HUBBLE LAW WITH THE IRAS 1.2 Jy REDSHIFT SURVEY Daniel M. Koranyi & Michael A. Strauss	36
ANISOTROPIC OBSERVATIONS IN UNIVERSES WITH NONLINEAR INHOMOGENEITY Neil P. Humphreys, Roy Maartens, & David R. Matravers	47
DETAILED ANALYSIS OF THE CROSS-CORRELATION FUNCTION BETWEEN THE X-RAY BACKGROUND AND FOREGROUND GALAXIES Alexandre Refregier, David J. Helfand, & Richard G. McMahon	58
THE WIDE-ANGLE ROSAT POINTED X-RAY SURVEY OF GALAXIES, GROUPS, AND CLUSTERS. I. METHOD AND FIRST RESULTS C. A. Scharf, L. R. Jones, H. Ebeling, E. Perlman, M. Malkan, & G. Wegner	79
THE SOFT X-RAY PROPERTIES OF A COMPLETE SAMPLE OF OPTICALLY SELECTED QUASARS. II. FINAL RESULTS Ari Laor, Fabrizio Fiore, Martin Elvis, Belinda J. Wilkes, & Jonathan C. McDowell	93
THE RELATION BETWEEN GAMMA-RAY AND NEAR-INFRARED RADIATION IN GAMMA-RAY-LOUD BLAZARS G. Z. Xie, Y. H. Zhang, & J. H. Fan	114
LOPSIDED SPIRAL GALAXIES AND A LIMIT ON THE GALAXY ACCRETION RATE Dennis Zaritsky & Hans-Walter Rix	118
THE IRON DISCREPANCY IN ELLIPTICAL GALAXIES AFTER ASCA Nobuo Arimoto, Kyoko Matsushita, Yuhri Ishimaru, Takaya Ohashi, & Alvio Renzini	128
A SEARCH FOR THE COOLING FLOW ACCRETION POPULATION: OPTICAL AND NEAR-INFRARED IMAGING OF NGC 1275 Andrea H. Prestwich, Marshall Joy, Christian B. Luginbuhl, Martin Sulkanen, & Mike Newberry	144
SATELLITE PARALLAXES OF LENSING EVENTS TOWARD THE GALACTIC BULGE B. Scott Gaudi & Andrew Gould	152
MODELING THE GALACTIC BAR USING RED CLUMP GIANTS K. Z. Stanek, A. Udalski, M. Szymański, J. Kałużny, M. Kubiak, M. Mateo, & W. Krzemiński	163
SPATIAL DISTRIBUTION OF EMBEDDED CLUSTERS IN THE ROSETTE MOLECULAR CLOUD: IMPLICATIONS FOR CLUSTER FORMATION Randy L. Phelps & Elizabeth A. Lada	176
TURBULENT DIFFUSION OF LARGE-SCALE MAGNETIC FIELDS IN THE PRESENCE OF AMBIPOLAR DRIFT Eun-jin Kim	183
INTERCLOUD STRUCTURE IN A TURBULENT FRACTAL INTERSTELLAR MEDIUM Bruce G. Elmegreen	196
THE RATE OF THE REACTION BETWEEN CN AND C2H2 AT INTERSTELLAR TEMPERATURES	204

	Page
INTRINSIC PROFILES OF STRONG DIFFUSE INTERSTELLAR BANDS J. Kretowski & M. Schmidt	209
³ He IN PLANETARY NEBULAE: A CHALLENGE TO STELLAR EVOLUTION MODELS Daniele Galli, Letizia Stanghellini, Monica Tosi, & Francesco Palla	218
THE TIMESCALE CORRELATION METHOD: DISTANCES TO PLANETARY NEBULAE WITH HALOS Arsen R. Hajian, Adam Frank, Bruce Balick, & Yervant Terzian	226
ASTROPHYSICAL EXTENDED X-RAY ABSORPTION FINE-STRUCTURE ANALYSIS Jonathan W. Woo, Robert C. Forrey, & Kyeongjae Cho	235
PHYSICAL CONDITIONS IN QUIESCENT DARK CLOUD CORES DETERMINED FROM MULTITRANSITION OBSERVATIONS OF CCS Debra Wolkovitch, William D. Langer, Paul F. Goldsmith, & Mark Heyer	241
MOLECULAR HYDROGEN IN THE DIRECTION OF ζ ORIONIS A Edward B. Jenkins & Antonio Peimbert	265
X-RAYS FROM THE IMPACT OF SN 1987A WITH ITS CIRCUMSTELLAR RING Kazimierz J. Borkowski, John M. Blondin, & Richard McCray	281
SPIN-DOWN OF NEUTRON STARS AND COMPOSITIONAL TRANSITIONS IN THE COLD CRUSTAL MATTER Kei Iida & Katsuhiko Sato	294
EVOLUTION OF HELIUM WHITE DWARFS OF LOW AND INTERMEDIATE MASSES L. G. Althaus & O. G. Benvenuto	313
COMPOSITION MIXING DURING BLUE STRAGGLER FORMATION AND EVOLUTION Eric L. Sandquist, Michael Bolte, & Lars Hernquist	335
SECOND OVERTONE PULSATORS AMONG δ SCUTI STARS Giuseppe Bono, Filippina Caputo, Santi Cassisi, Vittorio Castellani, Marcella Marconi, & Robert F. Stellingwerf	346
THE COMPOSITION OF NOVA EJECTA FROM MULTICYCLE EVOLUTION MODELS Attay Kovetz & Dina Prialnik	356
HYDRODYNAMICAL MODELS OF LINE-DRIVEN ACCRETION DISK WINDS Nicolas Antonio Pereyra, Timothy R. Kallman, & John M. Blondin	368
A LABORATORY FOR MAGNETIZED ACCRETION DISK MODEL: ULTRAVIOLET AND X-RAY EMISSION FROM CATACLYSMIC VARIABLE GK PERSEI Insu Yi & Scott J. Kenyon	379
EUV OBSERVATIONS OF EX HYDRAE: 10 ⁷ K GAS NEAR A WHITE DWARF SURFACE Mark Hurwitz, Martin Sirk, Stuart Bowyer, & Yuan-Kuen Ko	390
THERMAL PROCESSING OF INTERSTELLAR DUST GRAINS IN THE PRIMITIVE SOLAR ENVIRONMENT Kenneth M. Chick & Patrick Cassen	398
SPIRAL MODE SATURATION IN SELF-GRAVITATING DISKS Gregory Laughlin, Vladimir Korchagin, & Fred C. Adams	410
X-RAY OBSERVATIONS OF X2127+119/AC 211 IN THE METAL-POOR GLOBULAR CLUSTER M15: AN X-RAY MEASURE OF METALLICITY? D. J. Christian, A. P. Smale, J. H. Swank, & P. J. Serlemitsos	424
THE DRIFTING BEHAVIOR OF PSR B0031-07 M. Vivekanand & B. C. Joshi	431
THEORY OF HIGH-ENERGY EMISSION FROM THE PULSAR/Be STAR SYSTEM PSR 1259-63. I. RADIATION MECHANISMS AND INTERACTION GEOMETRY Marco Tavani & Jonathan Arons	439
HIGH TIME RESOLUTION INFRARED OBSERVATIONS OF THE CRAB NEBULA PULSAR AND THE PULSAR EMISSION MECHANISM S. S. Eikenberry, G. G. Fazio, S. M. Ransom, J. Middleditch, J. Kristian, & C. R. Pennypacker	465
A COMMENT ON THE RELATIONSHIP BETWEEN THE MODAL AND TIME-DISTANCE FORMULATIONS OF LOCAL HELIOSEISMOLOGY T. J. Bogdan	475
THE VECTOR MAGNETIC FIELD, EVERSHED FLOW, AND INTENSITY IN A SUNSPOT	485

THE IONIC CHARGE OF SOLAR ENERGETIC PARTICLES WITH ENERGIES OF 0.3-70 MeV	Pag 495
PER NUCLEON M. Oetliker, B. Klecker, D. Hovestadt, G. M. Mason, J. E. Mazur, R. A. Leske, R. A. Mewaldt, J. B. Blake, & M. D. Looper	
YOHKOH OBSERVATIONS AS A MEANS OF CHECKING S, Ca, AND Fe CORONAL ABUNDANCES AND He-LIKE IONIZATION FRACTIONS K. J. H. Phillips & U. Feldman	502
INVESTIGATING THE EFFECT OF OPACITY IN SOFT X-RAY SPECTRAL LINES EMITTED BY SOLAR CORONAL ACTIVE REGIONS J. T. Schmelz, J. L. R. Saba, J. C. Chauvin, & K. T. Strong	509
ERRATA	
THE GROWTH RATE OF TIDALLY EXCITED WAVES IN ACCRETION DISKS Ethan T. Vishniac & Changsong Zhang	516
High-Resolution 13 CO and C18 O $J=1$ -0 Observations of NGC 1068: Molecular Gas Properties of a High C18 O/ 13 CO Intensity Ratio Padeli P. Papadopoulos, E. R. Seaquist, & N. Z. Scoville	518
NEW INSTRUCTIONS TO AUTHORS	i
1997 MARCH 10, Number 2	
THE UNIVERSE AND GLOBULAR CLUSTERS: AN AGE CONFLICT? F. D'Antona, V. Caloi, & I. Mazzitelli	519
THE HUBBLE SPACE TELESCOPE EXTRAGALACTIC DISTANCE SCALE KEY PROJECT. VII. THE DISCOVERY OF CEPHEIDS IN THE LEO I GROUP GALAXY NGC 3351 John A. Graham, Randy L. Phelps, Wendy L. Freedman, Abhijit Saha, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, N. A. Silbermann, Shoko Sakai, Robert C. Kennicutt, Paul Harding, Fabio Bresolin, Anne Turner, Jeremy R. Mould, Daya M. Rawson, Holland C. Ford, John G. Hoessel, Mingsheng Han, John P. Huchra, Lucas M. Macri, Shaun M. Hughes, Garth D. Illingworth, & Daniel D. Kelson	535
COSMIC-RAY PROTONS AND MAGNETIC FIELDS IN CLUSTERS OF GALAXIES AND THEIR COSMOLOGICAL CONSEQUENCES Torsten A. Ensslin, Peter L. Biermann, Philipp P. Kronberg, & Xiang-Ping Wu	560
THE DUST-TO-GAS RATIO IN THE DAMPED Lyα CLOUDS TOWARD THE GRAVITATIONALLY LENSED QSO 0957+561 Lin Zuo, E. A. Beaver, E. Margaret Burbidge, Ross D. Cohen, Vesa T. Junkkarinen, & R. W. Lyons	568
MULTIWAVELENGTH VARIABILITY OF THE SYNCHROTRON SELF-COMPTON MODEL FOR BLAZAR EMISSION Mark W. Sincell	574
STOKES'S THEOREM APPLIED TO MICROLENSING OF FINITE SOURCES Andrew Gould & Cédric Gaucherel	580
SCALING LAWS FOR ADVECTION-DOMINATED FLOWS: APPLICATIONS TO LOW-LUMINOSITY GALACTIC NUCLEI Rohan Mahadevan	585
ASCA OBSERVATIONS OF SEYFERT 1 GALAXIES. II. RELATIVISTIC IRON Kα EMISSION K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob	602
A COMPARISON OF RADIO AXIS WITH HOST GALAXY PLANE AXIS IN SEYFERT GALAXIES Henrique R. Schmitt, Anne L. Kinney, Thaisa Storchi-Bergmann, & Robert Antonucci	623
INFRARED SPECTROSCOPY OF SEYFERT 2 GALAXIES: A LOOK THROUGH THE OBSCURING TORUS? II. Sylvain Veilleux, Robert W. Goodrich, & Gary J. Hill	631
HUBBLE SPACE TELESCOPE OBSERVATIONS OF THE BLUE COMPACT DWARF SBS 0335-052: A PROBABLE YOUNG GALAXY Trinh X. Thuan, Yuri I. Izotov, & Valentin A. Lipovetsky	661
ULTRAVIOLET COLORS AND EXTINCTIONS OF H II REGIONS IN THE WHIRLPOOL GALAXY (M51) Jesse K. Hill, William H. Waller, Robert H. Cornett, Ralph C. Bohlin, KP. Cheng, Susan G. Neff, Robert W. O'Connell, Morton S. Roberts, Andrew M. Smith, P. M. N. Hintzen, Eric P. Smith, & Theodore P. Stecher	673
HUBBLE SPACE TELESCOPE FAINT OBJECT SPECTROGRAPH SPECTROSCOPY OF LOCALIZED CHEMICAL ENRICHMENT FROM MASSIVE STARS IN NGC 5253 Henry A. Kobulnicky, Evan D. Skillman, Jean-René Roy, J. R. Walsh, & Michael R. Rosa	679
DETECTION OF COMPACT NUCLEAR X-RAY EMISSION IN NGC 4736	693

		Page
COMMENTS ON MISUNDERSTANDINGS OF RELATIVITY AND THE THEOROGY THE KREUZER EXPERIMENT C. Y. Lo	RETICAL INTERPRETATION	700
HUBBLE SPACE TELESCOPE WFPC2 OBSERVATIONS OF THE BINARY FRA PRE-MAIN-SEQUENCE CLUSTER STARS IN ORION Deborah L. Padgett, Stephen E. Strom, & Andrea Ghez	ACTION AMONG	705
NITROGEN SULFIDE IN GIANT MOLECULAR CLOUDS Douglas McGonagle & William M. Irvine		711
A SELF-CONSISTENT PHOTOIONIZATION-DUST CONTINUUM-MOLECULA OF NGC 7027 Kevin Volk & Sun Kwok	AR LINE TRANSFER MODEL	722
GRAINS IN IONIZED NEBULAE. II. HEAVY-ELEMENT DEPLETION J. B. Kingdon & G. J. Ferland		732
THE ROTATING GAS TOROID SURROUNDING THE K3-50A IONIZED BIPO Eric M. Howard, David W. Koerner, & Judith L. Pipher	LAR OUTFLOW	738
OBSERVATIONS OF MOLECULAR CLOUDS IN THE HH 1-2 REGION Minho Choi & Shudong Zhou		754
THE CHEMICAL EVOLUTION OF THE GALAXY: THE TWO-INFALL MODE C. Chiappini, F. Matteucci, & R. Gratton	L	765
ON THE ORIGIN OF MASSIVE ECCENTRIC PLANETS D. N. C. Lin & Shigeru Ida		781
ON THE EVOLUTIONARY PHASE AND MASS LOSS OF THE WOLF-RAYET- Alex de Koter, Sara R. Heap, & Ivan Hubeny	-LIKE STARS IN R136a	792
THE TEMPORAL EVOLUTION OF THE NEAR-INFRARED LIGHT CURVES (NOVA CYGNI 1992) Charles E. Woodward, R. D. Gehrz, T. J. Jones, G. F. Lawrence, & M. F. Skrutskie	DF V1974 CYGNI	817
SILICATE FEATURE VARIATION IN LONG-PERIOD VARIABLE STARS. I. IN Michelle J. Creech-Eakman, Robert E. Stencel, W. John Williams, & Dimitri I. Klebe	ITIAL OBSERVATIONS	825
ULTRAVIOLET EMISSION-LINE RATIOS OF CATACLYSMIC VARIABLES Christopher W. Mauche, Y. Paul Lee, & Timothy R. Kallman		832
THE EVOLUTION OF ULTRAVIOLET EMISSION LINES FROM CIRCUMSTE SURROUNDING SN 1987A George Sonneborn, Claes Fransson, Peter Lundqvist, Angelo Cassatella, Roberto Gilmozzi, Nino Panagia, & Willem Wamsteker		848
INSTABILITIES AND MIXING IN SN 1993J Kohichi Iwamoto, Timothy R. Young, Naohito Nakasato, Toshikazu Shigeyama, Ken'ichi N Izumi Hachisu, & Hideyuki Saio	Nomoto,	865
OPTICAL OBSERVATIONS OF GRO J1655-40 IN QUIESCENCE. I. A PRECIS BLACK HOLE PRIMARY Jerome A. Orosz & Charles D. Bailyn	E MASS FOR THE	876
THERMONUCLEAR BURNING ON THE ACCRETING X-RAY PULSAR GRO Lars Bildsten & Edward F. Brown	J1744-28	897
A BROADBAND X-RAY STUDY OF THE GEMINGA PULSAR J. P. Halpern & F. YH. Wang		905
THE MASS OF THE CLASSICAL CEPHEID S MUSCAE Erika Böhm-Vitense, Nancy Remage Evans, Kenneth Carpenter, Bernhard Beck-Winchatz,	& Richard Robinson	916
DERIVING THE GEOMETRY OF Be STAR CIRCUMSTELLAR ENVELOPES F SPECTROPOLARIMETRY. I. THE CASE OF ζ TAURI Kenneth Wood, K. S. Bjorkman, & J. E. Bjorkman	ROM CONTINUUM	926
ENRICHMENT OF ³ He AND HEAVY IONS IN IMPULSIVE SOLAR FLARES Ilan Roth & Michael Temerin		940
NONTHERMAL RADIO EMISSION FROM SOLAR SOFT X-RAY TRANSIENT Dale E. Gary, Michael D. Hartl, & Toshifumi Shimizu	BRIGHTENINGS	958

vii

	Page
THE STRUCTURE AND PROPERTIES OF SOLAR ACTIVE REGIONS AND QUIET-SUN AREAS OBSERVED IN SOFT X-RAYS WITH YOHKOH/SXT AND IN THE EXTREME-ULTRAVIOLET WITH SERTS Jeffrey W. Brosius, Joseph M. Davila, Roger J. Thomas, Julia L. R. Saba, Hirohisa Hara, & Brunella C. Monsignori-Fossi	969
NEUTRAL-NEUTRAL REACTIONS IN THE INTERSTELLAR MEDIUM. I. FORMATION OF CARBON HYDRIDE RADICALS VIA REACTION OF CARBON ATOMS WITH UNSATURATED HYDROCARBONS R. I. Kaiser, D. Stranges, Y. T. Lee, & A. G. Suits	982
ERRATUM	
A Long-Term Study of Broad Emission Line Profile Variability in NGC 5548 Ignaz Wanders & Bradley M. Peterson	990